



# IN-LINE CHROMATIC HARP WITH ADJUSTABLE STRING GUIDE

## BACKGROUND OF THE INVENTION

### Field of the Invention

This invention relates to an in-line chromatic harp, and more particularly to an in-line chromatic harp with an adjustable string position guide which allows a harp player to quickly identify the proper string for each note and to play any chromatic scale as if playing the C major scale.

### Description of the Related Art

An in-line chromatic harp is a string instrument which has the entire twelve semitones in an octave, like the piano, and therefore versatile in music performance. Its strings, like most harps, are arranged in one line. Since in each octave of the in-line chromatic harp has twelve strings instead of seven in a conventional harp, the string spacing is narrower so that each octave will not become too wide for the hands of the harp player. There are chromatic harps designed with two rows of strings, either parallel or cross each other to preserve the string spacing of

1 conventional harp. These harps had their position in  
2 the history and have been around for centuries.

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4 The advantage of an in-line chromatic harp is that  
5 every one of the twelve semitones in each octave are  
6 accessible from the finger tips without any additional  
7 mechanical movement such as pushing a foot pedal or  
8 moving a lever, which is the standard practice for harp  
9 playing. For example, the concert harp requires the  
10 player to push one of several pedals in order to play a  
11 # or b (sharp or flat) note. For lever harp, the player  
12 has to flip a lever to achieve the same result. These  
13 require skills and training. It also limits the music  
14 one can play and often the music may need to be re-  
15 composed to suit the instrument.

16 The in-line chromatic harp is, however, not  
17 without problems or difficulties, either. The most  
18 serious problem is that for the in-line chromatic harp  
19 the spacing between any two strings is generally  
20 narrower than the conventional harp. The standard  
21 color codes, red for "C" string and blue for "F" string,  
22 are no longer adequate for the purpose of indicating  
23 the string position because there are too many strings  
24 in between. The regular harp has only two white  
25 strings between the red string and blue string, and  
26 three white strings between blue string and red string;

1 therefore, there is no difficulty in identifying the  
2 location of any note or string. On the other hand, the  
3 in-line chromatic harp, if using the same color code to  
4 identify the "C" and the "F" strings, there will be  
5 four narrowly spaced white strings between the "C" and  
6 the "F" strings, and six narrowly spaced white strings  
7 between the "F" and the "C" strings. This arrangement  
8 becomes rather difficult to play because of the  
9 excessive number of the closely spaced strings.

10  
11 US Patent No. 2,137,160 discloses a guide to be  
12 disposed just behind the string with the same white and  
13 black key arrangement like the piano key so that anyone  
14 skilled in playing piano or organ can readily acquire  
15 proficiency in playing a harp with the guide.

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18 BRIEF SUMMARY OF THE INVENTION  
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20 It is therefore an object of the invention to  
21 provide an in-line chromatic harp with an adjustable  
22 string position guide, wherein the adjustable string  
23 position guide is rotatable.

24  
25 To achieve the above-mentioned object, the  
26 invention provides an in-line chromatic harp including  
27 a body, a plurality of strings and an adjustable string

1 position guide. The body is formed of a pillar, a neck  
2 and a sound box. The strings run from the neck to the  
3 sound box. The adjustable string position guide is  
4 movably installed behind the strings, with one end  
5 fixed to the pillar and the other end to the neck. A  
6 plurality of color dots is disposed on the surface of  
7 the string position guide and arranged in a specific  
8 pattern.

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10 The advantages of this invention will hereinafter  
11 become more readily apparent from the following  
12 specification and the enclosed drawings.

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15 BRIEF DESCRIPTION OF THE DRAWINGS

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17 FIG. 1 is a full side view of the invention.  
18 FIG. 2 is a cross-sectional view of the section 2-2.  
19 FIG. 3 is a perspective view of the structure of the  
20 string position guide of the invention.  
21 FIG. 4 is a drawing of the color dot patterns on the  
22 string position guide of the invention.

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25 DETAILED DESCRIPTION OF THE INVENTION

1        Figure **1** is a full side view of the invention,  
2        where the pillar **11**, neck **12**, sound box **13**, and the  
3        strings **9** and bridge pin **18** are typical of a Celtic  
4        folk harp. The adjustable string position guide **14** is  
5        shown installed a small distance **C** behind the strings  
6        as shown on figure **2**, so the string position guide **14**  
7        will not interfere with the vibration of the strings **9**.  
8        The string position guide **14** is mounted on the harp at  
9        an angle **A** to the strings **9** as shown in figure **1**. The  
10       string position guide **14** is positioned right above the  
11       proper finger position for playing the harp so the  
12       string position is easily identified with this  
13       arrangement.

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15       Figure **2** is a cross-sectional view of section **2-2**.  
16       Only the cross section of the adjustable string  
17       position guide **14** is shown here at a small distance **C**  
18       behind the strings **9**. The string position guide **14**  
19       depicted here is a square bar or a four sided bar. The  
20       bar can also be a triangular or hexagonal prism, and  
21       the same principle applies. For the sake of  
22       simplicity, from now on a square bar will be used in  
23       this specification except where further clarification  
24       is necessary.

25

26       Figure **3** shows a perspective view of the string  
27       position guide **14** with the pivot/slide pins **15a** and **15b**

1 which are fastened on the pillar 11 and the neck 12 as  
2 shown on figure 1, and with corresponding pivot/sliding  
3 holes 16a and 16b which are drilled into each end of  
4 the string position guide 14. On each side of the  
5 string position guide 14 there are multiple dots of  
6 different colors forming a special pattern which will  
7 be described later. Since the string position guide 14  
8 is not perpendicular to the strings 9, a string spacing  
9  $L$  on the string position guide 14 is equal to a true  
10 string spacing  $S$ , as shown on figure 1, divided by sine  
11 of the angle  $A$ , defined by the strings 9 and the string  
12 position guide 14 as shown on figure 1. Since the  
13 string spacing  $L$  on this harp is constant throughout  
14 the whole range, which is different from most harps,  
15 and therefore the string position guide 14 can slide in  
16 a axial direction, as shown by an arrow 17, without  
17 mismatching the color dot position to the strings 9 as  
18 we will see later the significance of this feature.

19

20 The detailed layout of the color dot patterns on  
21 the square bar is shown on figure 4. The color dot  
22 patterns for the four sides 14a, 14b, 14c and 14d of  
23 the square bar are being put side by side to show the  
24 inter relationship of the dot patterns.

25

26 On the first side 14a of the square bar, the color  
27 dots are arranged in the following way:

1 First dot is red and is located at distance **L** from  
2 the left end. The second dot is white and is located  
3 at distance **2L** from the first dot. The third dot is  
4 also white and located at distance **2L** from the second  
5 dot. The fourth dot is blue and located at distance **L**  
6 from the third dot. The distance between fourth and  
7 fifth is **2L**, fifth and sixth is **2L**, and sixth and  
8 seventh is **2L**. The distance between seventh and eighth  
9 is **L**. The spacing repeats itself for the rest of the  
10 surface, in this case, for three times. However, this  
11 should not be the limit and it depends on how many  
12 octaves the harp has. As it is shown on figure **4**, the  
13 first red dot represents the position for Do, the  
14 second dot for Re, the third dot for Mi, the fourth  
15 dot, a blue dot for Fa, the fifth dot for Sol, the  
16 sixth dot for La, and the seventh dot for Ti, and the  
17 eighth dot, a red dot again, back to Do of one octave  
18 higher. This color code arrangement is the same as a  
19 standard harp string color code, that is two white  
20 strings between red and blue string and three white  
21 strings between blue and red string and this makes the  
22 learning transition from a standard harp to this new  
23 in-line chromatic harp fairly easy.

24

25 The side **14a** is the first side of four sides which  
26 can be used for string position guide. The second side  
27 **14b**, the third side **14c**, and the fourth side **14d** can be

1 switched into position by turning the square bar on its  
2 pivots **15a** and **15b** within the holes **16a** and **16b** as the  
3 arrows indicated in figure 2.

4  
5 On the second side **14b**, the dot spacing pattern is  
6 the same as **14a** except the first red dot is shifted a  
7 distance of **3L** to the right as shown in figure 4. On  
8 the third side **14c**, the first red dot is shifted a  
9 distance of **6L** to the right as shown in figure 4. On  
10 the fourth side **14d**, the first red dot is shifted a  
11 distance of **9L** to the right as shown in figure 4. If  
12 the string position guide 14 is a triangular bar the  
13 red dot lateral shift will be **4L** from one side to the  
14 next side. If the string position guide 14 is a  
15 hexagonal bar the red dot lateral shift will be **2L** from  
16 one side to the next side.

17  
18 It becomes apparent that, by turning the string  
19 position guide **14** 90 degrees from one side to the next  
20 side, the position of "Do" is shifted up or down three  
21 half-tones depends upon the direction of turning. If  
22 the string position guide 14 is a triangular bar, the  
23 turning will be 120 degree, and if the string position  
24 guide 14 is a hexagonal bar, the turning will be 60  
25 degrees.



1       The string position guide 14 is held by two pivot  
2 pins **15a** and **15b** inside the holes **16a** and **16b**. The  
3 holes are deep enough so that the string position guide  
4 **14** can slide axially up and down by at least three **L** as  
5 shown by the arrow **17** on figures **1** and **3**. This allows  
6 the first red dot or "Do" to be set at any of the three  
7 positions at each side of the string position guide 14.  
8 If the guide 14 is a triangular bar, the axial movement  
9 will need to be at least four **L**, if the guide 14 is a  
10 hexagon bar, the movement will need to be at least **2L**.

11

12       The result of this arrangement will allow "Do" on  
13 this string position guide to be placed at any one of  
14 the twelve possible positions of the chromatic music  
15 scale required by music.

16

17       Since the patterns of the dot arrangement on all  
18 four sides are the same, except that the dots for each  
19 pattern are being shifted right or left, the finger  
20 position, once learned by the player, would be the same  
21 no matter in what "key" the music is written. This is  
22 a tremendous simplification in playing music. In fact,  
23 this makes playing this in-line chromatic harp a lot  
24 easier than learning how to play piano, especially for  
25 music composed in a scale, other than "C Major", with  
26 many sharps or flats. This is an instrument for an

1 amateur to play like a professional without a long and  
2 tedious learning process.

3  
4 The color dot patterns on the string position  
5 guide 14 can be made in black and white, as described  
6 in US Patent No. 2,137,160, and shifted three half-tone  
7 from one side to the next side. Further, anyone can  
8 play the harp of the present invention with music  
9 playing simplified and without the complicated usage of  
10 the black keys when the music is not written in "C  
11 major".

12  
13 A special color mark (red is preferred in this  
14 case) is placed on the bridge pin **18**, as depicted on  
15 figure **1**, of the middle C string to identify the  
16 starting reference point of the string position guide  
17 14. This position designates the location of the  
18 central note for the "C Major" scale.

19  
20 The beauty of this invention is that there is no  
21 mechanical motion to change the string length to  
22 achieve semi-tones like either the pedal harp or the  
23 lever harp. To slide the guide up or down a fraction  
24 of an inch, or to turn the guide around its pivot is  
25 very simple without even touching the string and yet  
26 the chromatic music scale is transposed up and down at  
27 the player's wish with minimal effort.

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2       While the invention has been described by way of  
3 examples and in terms of preferred embodiments, it is  
4 to be understood that the invention is not limited to  
5 the disclosed embodiments. To the contrary, it is  
6 intended to cover various modifications. Therefore,  
7 the scope of the appended claims should be accorded the  
8 broadest interpretation so as to encompass all such  
9 modifications.